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ABSTRACT

This booklet, one in a series about life on modern farms, describes the daily lives of three orange growers in Florida and one in California. Two of the Florida orange growers also have other jobs, one as manager of a citrus cooperative and the other as a citrus insurance salesman. The operations of orange groves, the care and picking of oranges, and how oranges are processed are explained in the booklet. Although the booklet focuses on orange growing, it includes discussion of major topics that are common to all of the booklets: (1) farming as a business, (2) the impact of technology on farming, (3) the increasing specialization in farming, (4) the role of government in agriculture, (5) the diversity in farming, (6) the interdependence between agriculture and the rest of the economy, and (7) the way of life of farmers and their families. The booklet is illustrated with black and white photographs. (KC)

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PEOPLE ON THE FARM:

GROWING ORANGES

U.S. DEPARTMENT OF AGRICULTURE
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ED244127

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PEOPLE ON THE FARM:

GROWING ORANGES

Art Mathias plunged the four-door sedan off the last semblance of a road and powered it into the heart of an orange grove, dodging among the trees to find the firmest ground.

It was a beautiful spring day in central Florida, but the sedan's windows were closed because orange tree branches were slapping along the sides of the vehicle. The car looked as if it had been polished with a brick.

"I'm in charge of operations and the operations are out in the field," he explained simply. Mathias, then assistant general manager of the Haines City Citrus Growers Association, added, "I tell our supervisors that if they don't get their cars scratched up they aren't doing their job. They can't do the job I want them to do unless they're out in the groves."

On this day weeks after a blanket of subfreezing temperatures had fallen across the State's multi-million dollar orange crop, Mathias wanted to check personally on the amount of damage done.

Other growers were concerned, too. Among them, Cecil Hull in adjoining Lake County and Tom Sasser down in Wauchula, Florida, were checking their trees almost daily. Harvesting was far from complete. But beyond the concern about the fruit, growers were worried about the trees themselves.

If many trees were killed, production could be set back 8 years. It takes 5 to 8 years to get enough oranges out of new trees to pay for their upkeep.

Mathias is a concerned grove owner as well as manager of a growers' cooperative. "The freeze is going to affect my income this year, too," he said. And then he added, "but I don't know which way—up or down."

A FREEZE CUTS PRODUCTION

A freeze that severely cuts orange juice production can bring higher prices for oranges. Then the question for the individual grove owner becomes: Will the higher prices offset my lower production? Some owners might lose most of their crop. In that case, higher prices can't save their income. Those whose crop survived—through extra care, fortunate location, or both—would benefit from the higher prices.

On that day Mathias was especially concerned about the number of blossoms he would find on the neatly aligned trees. Few trees had been killed by the freeze, he believed, but had enough branches been damaged to reduce blossoming significantly? If so, that would mean fewer oranges next year.

Mathias maneuvered the car up out of a "middle" (the trees are in rows and you drive down a middle between them) onto a relatively firm road.

People were busy where he stopped. Roy Brooks, picking crew foreman, was cutting an orange open with a long-blade citrus knife. He too wanted to see how much damage the freeze had done to the fruit. Nearby, a dozen pickers were perched on ladders leaning into 18-foot-high trees and were filling large bags with ripe oranges. Some pickers were on the ground emptying their bags into wooden boxes. When full, the boxes would be carefully picked up by a machine which would then be driven to a flatbed trailer parked in a nearby lane. There the boxes would be stacked like toy blocks on the trailer, which, when full, would be hauled to the packing plant.

Fifty yards away, Tommy Tatsey was fixing the nozzle on a fertilizer boom behind a tractor.

TREES BLOSSOMING

Mathias slid out of the sedan and looked around. He seemed pleased by the number of blossoms he saw (Valencia orange trees blossom and bear fruit at the same time). Examining a branch he said, "This is my favorite time of the year—when the buds swell and the blossoms start to pop out."

Turning to Brooks, he chided the big man about his pickers not getting every orange off the trees. Then he asked how many pickers Brooks had in his crew that morning.

"About 15," Brooks replied.

"But you have 20 on your list, haven't you?" Mathias asked. It was not a casual question. At 7 a.m. that day, Mathias had gone over the work schedule of all the crews with his supervisors.

"Yes," replied Brooks, "but some of them are out today. Every day somebody's got something."

Time was running against the growers. Mathias wanted all the pickers he could get to harvest the oranges before they dried up after freeze damage. Normally, oranges can stay ripe on a tree for weeks—even months—but freezing temperatures break down the walls of the little pockets of juice inside an orange, and the water transpires through the skin of the fruit into the air.

It was taking 30 to 40 minutes for each picker near Mathias to get all the oranges off the 25-year-old trees. That amount of time is normal.

Pickers are paid by the box—40 to 50 cents a box before the freeze of 1977—but pickers are also covered under a minimum wage

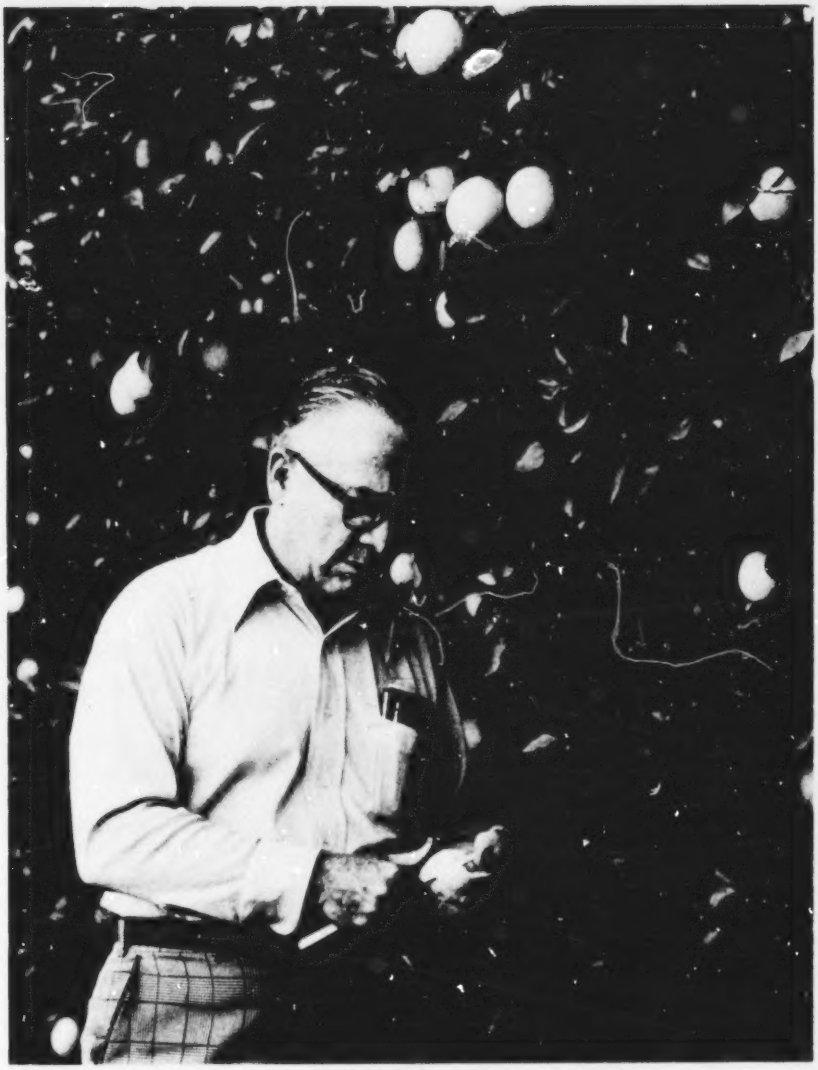
law which at the time assured them of $2.20 an hour. A box of oranges in Florida contains 1-3/5 bushels of oranges, about 215 oranges of the Valencia variety being picked by Brooks' crew.

PICKERS BUSY

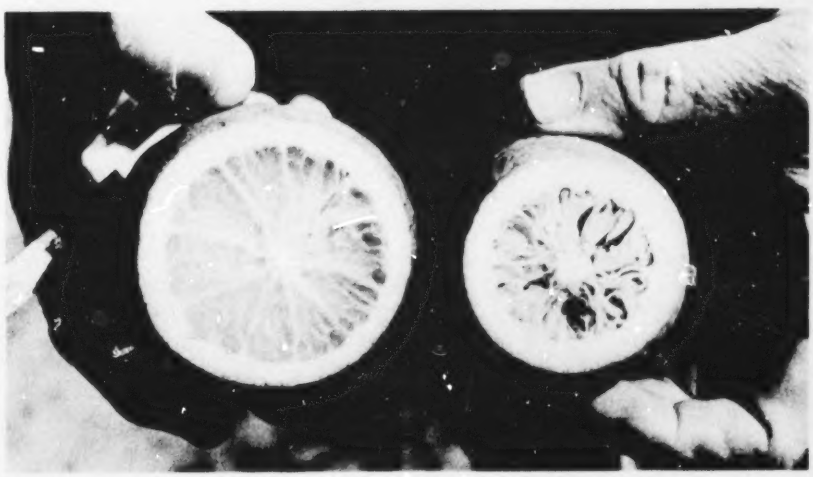
Starting at the top of the tree, the pickers swung rythmically back and forth on the ladder like metronomes in slow motion, descending steadily down the ladder as the oranges were drained from the trees into their bags. It would be hard to imagine a harvesting machine working more effectively (though growers have been assessing themselves three-tenths of a cent per box of fruit for years just to develop such a machine).

An average picker might pick 60 boxes a day. At 45 cents a box, that would mean $27 in a 6-hour day for picking about 13,000 oranges. Some pick more than 100 boxes a day.

After the freeze of 1977, pickers were paid as much as 75 cents a box. Grove owners and managers were willing to pay more because it was important to get freeze-damaged fruit to the processing plants as soon as possible.



When Art Mathias of Haines City, Florida, grows thirsty at work, there's usually a thirst quencher right on the tree beside him. Peeling an orange with his citrus knife, Art says the blossom end of the fruit is sweeter.



A freeze breaks down the cell walls inside affected oranges. Juice then transpires through the skin of the fruit into the air, leaving a wilted interior.

Rudy Villegas, foreground, and his brother Robert, of Visalia, California, demonstrate how oranges are picked. Though both have moved from picker status to full time caretaking employment on Mardo Farms, one never forgets how to pick. They're picking navel oranges from trees planted in 1913.

Oranges usually produce 1.16 to 1.32 gallons of frozen concentrated juice to a field box (90 lbs.). After the 1977 freeze, though, the crop averaged 1.07 gallons per box. Quite a difference.

In 1971/72, when citrus pickers were paid 43 cents a box, the average pay of a picker was $3.26 an hour and $19.42 a day.

The average picker could have earned as much as $4,274 for the season if he'd worked every possible picking day. Only the top 4 percent of the pickers earned more than $7,500 during the 36-week season, which spreads through roughly the same months as the school year in Florida.

However, from the point of view of most Florida grove owners, harvesting just happens. Either the grove manager or the firm to whom the owner has sold the oranges arranges it.

Harvesting is the most labor intensive aspect of orange production. It was reported in 1963 that picking and hauling combined called for 118 of the 166½ man-hours needed to grow an acre of oranges. Together, picking and hauling accounted for $124 of the $181 in labor costs.

Picking methods depend on the end use of the orange. If the oranges are going to be processed for juice, much less care is necessary in handling the individual fruit. The fruit will be squeezed and discarded long before any decay can set in. In fact, such oranges are often dropped to the ground as they are picked from the tree, then picked up again and tossed into bins or tubs, which are emptied into special small carriers called goats. The goats are then carried to a trailer or truck at the edge of the grove. From there, the oranges are trucked to the processor.

Oranges that are intended for the fresh fruit market are handled a lot more carefully. A skilled picker nips the orange off the tree without tearing open the fruit and deposits each orange in a large sack that he carries over his shoulder. This sack is then emptied into a box and the fruit sent to a packing house.

"Our harvest crews are made up mostly of good local people," Mathias said. "We use some of them in the summer for other jobs. We also contract for some harvest crews, which include a lot of migrants."

The average wage for pickers at the cooperative in 1976 was $3.65 an hour, Mathias said.

Had Mathias ever picked oranges? "No," he said, "I tried, but it was too hard."

Instead, Mathias went to the University of Florida, majored in horticulture, and worked his way up in the cooperative.

THE PICKERS

Three-fourths of the Florida orange pickers interviewed in a 1971/72 survey said they would rather do farm work than any other kind of work.

An average picker working full time in an average crew could have earned about $4,275 during the 1971/72 picking season, which ran from mid-September to mid-July (though the big demand doesn't start until mid-December and lasts until the end of June).

The earnings of pickers in that year varied widely according to ability, the amount of work available, and the number of days a picker worked. One picker in the 1971/72 survey, who was paid at about the same rate as in 1975/76, earned $7,831.61.

People who hire the pickers say it's hard to keep pickers working 5 days a week. The average Florida picking crew puts in 7 hours a day and 36 hours a week, but individual members of the crew studied in 1971/72 averaged only 15 hours a week with one crew. That doesn't mean the pickers stayed home. Pickers change crews a lot.

Labor contractors—crew leaders—are the subject of much controversy.

Broken promises are one of the principal reasons a picker might not stay with a crew more than 1 day, according to James Logan, a former picker who is now an investigator with Florida Rural Legal Services.

"Labor contractors promise you the world," Logan said, "but when you get there, you find you won't be paid as much as you thought. You might find you are expected to put more than 10 boxes of oranges in a tub. That's unfair because you are paid as if you had picked only 10 boxes. The next day you look for another job. Or if you refuse to pick more than 10 boxes to a tub, the contractor won't pick you up in the morning."

Logan thinks most pickers work a minimum of 5 days a week and that a lot of them work 6 or 7 days a week. In the northern regions of Florida, he said, pickers might work 6 to 8 months a year; but in the South, they might work nearly all year, though not necessarily in citrus groves.

In seasons hit by freezes, pickers may be limited in the amount of fruit they can pick, so the amount of time they are allowed to work may be limited.

In California, one notable effort to encourage harvesters and pruners to stay with one employer throughout the season and to return year after year tripled worker productivity in 6 years. Inducements included paid vacations, a retirement plan, reassignment each year to the worker's former crew, promotion from the ranks, and counseling on a wide range of subjects and personnel practices which recognized that most of the pickers were of Mexican descent. (Fiestas are sponsored on special days.)

As a worker under this system leaves at the end of a season of working with lemons, a computer provides him with a print-out of all his earnings and benefits, as well as a reminder that he will find a job waiting on his return. The same computer sends Christmas greetings to his home, even if it's in Mexico.

One such greeting surprised a mother who hadn't seen her son in 3 years and thought he was dead. She wrote back. When her son showed up for work in February, he was told to write his mother—and he did.

The 1971/72 Florida survey indicated that the pickers interviewed averaged 18 years of experience in farm work and that, in general, they were older than other farm workers. The citrus worker's average age was 41. Only 14 percent of the Florida citrus pickers were under 25 years old, yet among the U.S. farm labor force as a whole, 59 percent were under 25.

Florida employers in 1971/72 said that 7 out of 10 of their pickers were local residents and that only 1 out of 4 was an out-of-State resident or migrant.

More than one-fourth of the surveyed pickers owned their own homes. Extremely large families were not particularly common; the average household contained only 3.8 persons.

Only one in five of the surveyed pickers insisted on having his children with him in the grove during school hours. Employers generally discourage this and often help the children get enrolled in local schools. Yet, Logan said, some crew leaders won't hire a picker unless the whole family picks.

The vast majority of the pickers and their families said they didn't use available public programs during the year before the survey. Only 17 percent had used free medical clinics, 13 percent had received food under a surplus food distribution program, 11 percent had used food stamps, and 11 percent had received welfare payments.

What had they lived on when they weren't working? They supported themselves mainly on their savings (39 percent) and the earnings of others in the family (31 percent). In early 1977, disaster unemployment benefits became available after the freeze. In 1978, regular unemployment benefits financed by employers were to be made available, with eligibility rules established by States. Payments in Florida would be based on amounts earned and weeks worked by each picker.

Clippers in the hand of a skilled picker move swiftly from orange to orange. If the fruit were pulled from the twig, a fungus disease could develop later in bruised skin openings. Fruit destined to become orange juice is processed too soon to need such careful attention.

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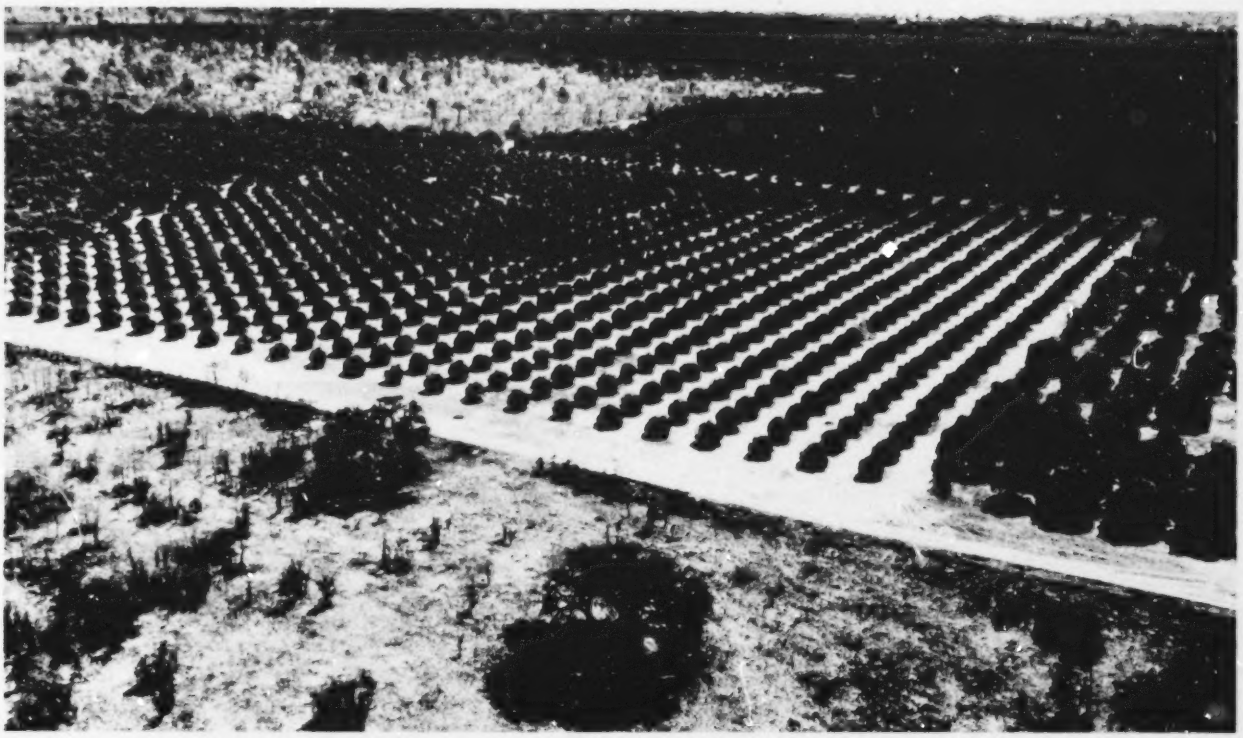

Spaces between trees in a young Florida orange grove will fill in with fruit-burdened branches in the years ahead. Between rows of trees are the "middles" which permit passage of vehicles for spraying, fertilizing and hedging.

TREES NEED TO BE FED

Mathias turned his attention to the fertilizer project nearby. A tractor operator was pulling a tank trailer between the trees. A boom attached to the tank sprayed liquid ammonium nitrate beneath the trees. At the same time, a spreader behind the tank was spewing dry potash granules over the ground.

The trees were being fed some of the nutrients they need to grow, stay healthy, and produce fruit.

Mathias fertilizes the cooperative's 450 groves twice a year. Costs are high—about $2,000 for a typical 30-acre grove.

"There's a lot of 'magic' associated with fertilizer," Mathias said. "Some people insist that you must apply it three particular times a year. I don't think timing is important and I put it on twice a year."

Scientists say 12 elements are needed by orange trees to grow and produce well, in addition to carbon and oxygen (taken in as carbon dioxide from the air by leaves) and hydrogen (taken in by the roots from water). The necessary dozen are nitrogen, phosphorous, potassium, calcium, magnesium, sulfur, iron, copper, manganese, zinc, boron and molybdenum.

These are practically the same elements needed by the human body for good health and growth. Other elements said to be needed by humans, some only in trace amounts, are sodium, chlorine, iodine and cobalt.

Some ingredients that have been applied regularly in the tree's early life need no longer be applied as the tree matures.

"Growing citrus is very nearly hydroponics (the growing of plants in nutrient solutions)," Mathias said. "Our soil just holds up the trees. We add about everything else that the tree needs."

Satisfied with the fertilizer operation that he saw, Mathias slid back into the car and headed for Number 208 down the road. Groves in the cooperative have numbers for names, and when the supervisors talk to each other on 2-way radios, much of the conversation is in numbers.

("Car 5 to No. 18. Are you going to 208, Raymond?" "10-4.")

Mathias, since promoted to general manager, manages 8,500 acres and 700 workers (200 of them full time) through supervisors and foremen. The cooperative's groves—averaging 34 acres in size—are scattered within a 25-mile radius of Haines City, deep within Florida's citrus-loaded ridge area.

HOW SWEET IT IS

Some of the busiest workers in the Florida orange groves at blossom time in the spring are the bees.

They're brought in by beekeepers who have found there's a ready market for orange-blossom honey.

The bees stay about 3 weeks. They aren't essential to the production of oranges because all citrus is self-pollinating except some hybrids, such as tangelos.

HEDGERS ARE NOISY

In a matter of minutes, Mathias was at No. 208. He was looking for a hedger, a machine that trims tree sides as if they were the sides of a hedge. It wasn't hard to find.

The first thing you notice about a hedger is its noise . . . the scream of huge circular saws—12 to 20 of them—spinning on metal arms that extend high out in front of an enclosed vehicle.

As Mathias stepped out of the car, the scream of the saws cutting through branches grew louder and louder until eardrums cringed at the assault.

Mathias stood at the end of a middle as the hedger approached. Could the operator see through the storm of severed citrus branches?

"Does he know that a fireplug's there, Raymond?" Mathias shouted to Raymond Henry, foreman of the cooperative's central area, who was standing beside him.

"I'm fixin' to show it to him again," Henry replied. He waved his arms.

The hedger climbed up onto the road, swung away from the fireplug and the two men at the last moment, and started toward the adjoining middle. Then the operator stopped the machine and cut the speed of the saws. He looked at Mathias inquiringly and Mathias walked over to him. They talked briefly and the operator went back to work.

As orange trees grow larger and closer together, they become more difficult to pick. Fewer oranges will grow as less sunlight reaches lower branches. Hedger's trim off the excess branches of the older trees about every 2 years in this cooperative's groves.

After inspecting the hedging operation, it was time for Mathias to drive into Haines City for lunch at the friendly little restaurant where the civic clubs meet at noon. Mathias wouldn't be joining a club meeting today but would find other companions who would be likely to talk about the citrus business.

Screaming circular saws on a hedger trim branches off citrus trees from top to bottom so that new growth will find sunshine and bear more fruit. Sometimes even the tops of older trees are trimmed to prevent their growing so high they can't be picked by men on ladders.

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WHAT IS THE WEATHER FORECAST?

Before going to lunch, Mathias headed for the cooperative's production headquarters, a complex of buildings where machinery is stored and repaired, where fertilizer is mixed from raw ingredients, and where work assignments are issued daily. What Mathias wanted to see was the teletype machine which steadily pours out current weather information.

The U.S. Weather Service keeps Floridians informed several times a day about the temperatures which can be expected that day, that night, tomorrow and beyond by zones within the State. The Haines City cooperative is so concerned that it subscribes to a special weather wire service. It was a printout from the wire service machine that Mathias wanted to read.

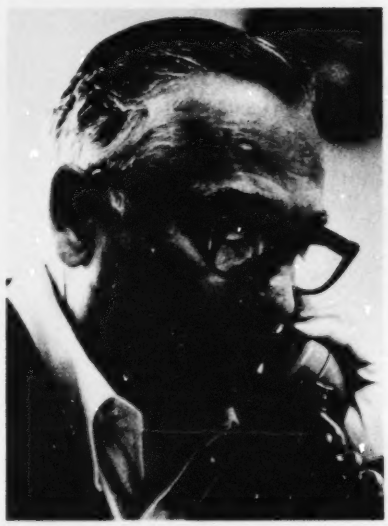
If the Weather Service predicted a freeze, though, few grove managers in Florida would scurry around to light grove heaters (the successors of the familiar smoke pots). Less than 5 percent of the State's groves use such heaters. The cost of fuel is so high and the chance that a freeze will kill the trees so slight that few owners invest in the equipment, even though an occasional crop of fruit might be damaged by a freeze.

For those who do invest in heaters, though, Mathias wants to be ready to get the heaters out for a night's burning if freezing temperatures are predicted. Townspeople, especially young people, automatically appear at the production headquarters the afternoon that a freeze is predicted and offer to help. They are hired to get out the heaters, light them, and watch after them all night. The owners who want such service pay extra to the cooperative for arranging it.

Then there are wind machines. About 2 percent of Florida's grove owners buy wind machines, which are really airplane propellers on towers. Those few (35) in the cooperative's groves will be turned on if a radiation (nonwindy) freeze hits the area. The idea is to stir up the colder ground air and mix it with higher, warmer air.

WEATHER SERVICE TAMPA BAY AREA RUSKIN FL
34 TO 38 PATCHY FROST
36 TO 40 CHANCE PATCHY FROST
36 TO 42
MOSTLY 40S
UPPER 40S TO LOW 50S
50 TO UPPER 50S EXCEPT LOW 60S

Early in March 1977, the teletype machine in the Haines City Citrus Growers Association office warns of possible frost in various areas of Florida overnight. In California's San Joaquin Valley, warnings of fog are important, too, in the winter because fogs can delay harvesting.



Mathias' orange-colored telephone demands attention in his office. In the groves, his car radio is part of a 32-unit two-way radio system.

All such devices aim to keep both the trees and the fruit from damage.

Oranges should be kept at 30° F or above while on the trees, since they will be damaged if the temperature falls to 28° F and stays there for a few hours. If the night gets colder than 28° F, fruit damage can occur sooner.

The number of times in this century that trees have been seriously damaged in Florida's citrus belt can be counted on one hand. That's why the grove owners generally are willing to take a chance and don't use the heaters.

What is spooky, though, is the different effects that cold can produce on trees growing in the same area. On seemingly level ground, there can be an 8° to 10° F difference in spots 600 feet apart, Mathias said.

Cold air, like water, flows to lower levels. As it flows, the warmer air above it descends, cools and flows to the same lower spot. Cold air piles up in the lower spot.

A tree on ground only inches lower than its neighbor can be damaged in a freeze while its neighbor survives.

After being reassured of warmer weather by the teletype printout, Mathias drove to the restaurant. Usually, he would go home, (Haines City) or—from January to May—to his lakeside cabin 12 miles away.

In a few days, Mathias would address one of the civic clubs which meet at the restaurant, and would tell the members about the importance of the citrus industry in their lives.

Agriculture is second only to tourism as a direct source of income in Florida, and citrus is the most important source within agriculture. In Polk County, where Mathias lives and works, citrus fruit is valued at $101 million just hanging on the trees (it is worth more when it is harvested and moved to market). Citrus accounts for 73 percent of the farm income in the county. The agribusiness industries which depend on the growers do $420 million worth of business a year.

That's what Mathias would tell the civic club. A 57-year-old former bomber pilot, he's proud of the citrus industry. He's seen orange production in the State grow from 45 million 90-pound boxes in the forties to 187 million boxes in 1976/77.

Active in the citrus industry's policy groups, Mathias is on the budget and audit committee of Florida Citrus Mutual (FCM), an active organization of growers. He also is chairman of the research committee of the Florida Citrus Commission, a kind of board of directors for the Florida Department of Citrus, which regulates and sets standards in the industry and does everything possible to promote the sale of citrus products.

"Privately, though, we're not great socializers," Mathias said of his family life. He and his wife Butch (everyone calls her Butch—her mother included—though her name is Mabel Jean) have two children, daughters,

Art Mathias' wife Butch and their granddaughter, Kelly, are fishing partners. In photo portraits above them are, left to right, Kelly, Angela, and Steven, their three grandchildren.

both married, and three grandchildren. They spend their vacations in North Carolina in August, "when it's hotter than blue billy down here" and when there's little work to be done in the orange groves.

Asked if he ever "lays around" on any of Florida's famous beaches, Mathias said, "Lord, no. And I've never been to Disney World (just down the road), and only once to Cypress Gardens (even closer). Too close to the forest, I guess."

"My wife and I have an agreement," Mathias declared solemnly. "I can play golf anytime I want to and she can fish anytime she wants to. She cleans her fish and I clean my golf clubs."

Mathias is more of a farmer than most grove owners in Florida. He manages his own grove as well as all the others in the cooperative.

"I consider myself a farmer," he said, "I own acreage. I grow crops on it and I harvest it. For the cooperative, I'm farming for someone else and on rather a large scale."

Very few, if any, Florida orange grove owners still live within a mile of their groves. Most of the grove owners probably still live in Florida—though no hard

statistics substantiate this fact—and probably in a city. An estimated 30 percent of them, however, live outside the State.

Furthermore, hardly any grove owners do any physical labor in their groves; and few of them even get involved in the grove's management, though they often make key decisions based on the recommendations of their hired managers.

One grove owner who gets involved in the management is Cecil Hull of Lakeland, who is both a grove owner-manager and a representative of Florida Citrus Mutual.

"We've developed more elaborate and more complete caretaking units than those in any other kind of agriculture," Hull said. "A Florida grove owner doesn't have to own any machinery. He doesn't really have to know where his grove is. He just invests and hopes everyone treats him well. And the track record in this regard is good."

VARIETY OF GROWERS

Rifling through FCM membership cards in the living room of his suburban home, Hull read off the occupations of typical grove owners: "Salesman, office manager, totally in citrus business, widow, insurance, employee of a fruit company, retired general, real estate appraiser, gas company employee."

The influx of capital into Florida has increased the competition for land, Hull said, so that land is passing out of the hands of farmers into the hands of investors.

Another factor influencing grove ownership is the cost of production.

Mathias commented: "Right after the war, a lot of young men took over family groves—worked

WOMEN IN CITRUS

Women are said to own some 70 percent of the citrus-growing acreage in Florida, either directly or in partnership with their husbands. Recently some of them decided to learn more about the handling of their investments.

They started an educational program called Women in Citrus.

As many as 200 women showed up at the seminars, workshops, and "go see" trips sponsored by the Center for Continuing Education for Women at Valencia Community College in Orlando and the Cooperative Extension Service. They learned about citrus in the world food situation, about the effect of urban growth on orange groves, details about the production and marketing of fruit, and how best to ask the caretaking contractor about production decisions. They especially liked the discussion of production decisions, according to Beatrice B. Ettinger, who, as director of the Center in Orlando and a grower, started the meetings.

Of course, a lot of Florida women manage their own groves and have a reputation for knowing their business. The meetings were designed for the many who don't.

A couple of women ran for election to the board of Florida Citrus Mutual, a grower's organization with some 16,000 members in 1976 and 1977, but they were rather soundly defeated.

In the summer of 1977, however, the Governor of Florida appointed the first woman member of the 12-member Florida Citrus Commission, Margaret E. Lowry of Tampa. That's progress, Beatrice Ettinger believes.

As a field representative for a grower's organization, Cecil Hull of Lakeland, Florida has a lot of paper work to do, which he saves for rainy days. Usually he is out on the road or managing his family's citrus grove in the next county.

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alongside their dads. Very few do that anymore. The cost of doing things has become so high, the small grower just can't compete.

"A spraying machine costs $23,000, a tractor to haul it costs $9,000, and a truck to carry the supply of spray material, another $9,000. One such spray unit can handle 500 acres or a little more."

The owner of a 500-acre grove (worth $2½ million at $5,000 an acre) can use the expensive spraying equipment more than a small grove owner can. His large investment is working rather than lying idle.

The small owner's option is to contract for the work to be done by equipment owners. "With today's prices for oranges (before they went up)," Mathias said, "all that a grower can get may be what he saves by belonging to a (nonprofit) cooperative."

Mathias was talking about a farmer cooperative in which grove owners in the cooperative share the costs of production as well as the costs of marketing of their crops.

"Still," Mathias warned, "while belonging to a co-op guarantees that a crop will be sold, it doesn't guarantee the crop will be sold at a profit."

While each grove in the cooperative is privately owned, the owners have turned over management and marketing responsibilities to the management of the cooperative.

Every month, each of the 250 owners in the cooperative, including Mathias, receives a statement explaining how much was spent on his or her grove, the quantities of chemicals applied, and the amount of labor put into the grove.

The average cost of production of all citrus fruit in the Haines City cooperative was $236 an acre in 1976/77. In Mathias' own grove, it costs $250 an acre to grow oranges.

At lunch, discussing his reasons for being an orange grove manager, Mathias said, "I just like to grow things. I get a lot of pleasure out of seeing a crop bloom, go into a packing plant, and come out the other end."

What is his biggest problem?

"Human relations are what I worry about the most—keeping people who are working for me happy and satisfied, keeping myself happy, and keeping the grower happy.

"I've often thought kids go to school to learn how to handle trees," he said, "but you get one of them out here and he can cause you more grief in 15 minutes—because the school didn't teach him how to handle people."

In partnership with his brother-in-law, his wife, and his brother-in-law's wife, Mathias owns 65 acres of grapefruit, oranges (Valencias, Hamlins, and Pineapples) and Nova tangelos. The partnership netted almost $22,000 on the operation in 1975/76, before income taxes.

After lunch, Mathias returned to the groves. He wanted to see if some new trees were being planted, as the morning work schedule had indicated.

On a slight rise of land, just inside a grove, Mathias found Carl Dennis and Emmett Trim planting a new tree under the direction of Bob Adair, foreman for the northern region of the cooperative's groves.

In a space between two trees, where another tree had once stood, the workers methodically scraped the ground flat, dug a hole, brought over a young Valencia tree from a pickup and put it in the hole. It stood about a yard high.

Water was poured in the hole and the hole filled with a dirt-clay mixture. The new young tree would get a special watering every 3 or 4 days until it was established.

The new tree cost the Haines City cooperative about $2.50 at a neighboring nursery. It is actually two trees: the upper part (scion) comes from one tree; the roots and lower trunk (rootstock) were raised from the seed of another variety. A bud from a tree that is desirable is grafted to the short trunk of the tree grown from seed.

MATHIAS-MURPHY GROVES—1975/76

EXPENSES

Growing care	$21,328.54
Harvesting	28,720.56
Property tax	1,592.55
Payment on loan for irrigation equipment	1,289.85
TOTAL	$52,931.50

INCOME

Sale of fruit	$67,523.83
Cooperate patronage refunds*	7,320.26
TOTAL	$74,844.09

Income	$74,844.09
-Expenses	52,931.50
Net**	$21,912.59

* Grove owner's share of this marketing cooperative's margin between costs and revenues.

** Net income to be shared by partners

BEST COPY AVAILABLE

Emmett Trim gets plenty of sunshine while planting replacement trees in Florida.

Right:
New orange trees are produced by affixing the bud of a desirable fruit variety to the rootstock of another, probably disease-resistant, variety of orange. When the scion—the leafy bud—has developed, the top of the rootstock is lopped off and the budded plant becomes one tree.

HOW TO BUD

To demonstrate the technique of budding one variety to another, Mathias reached up into the branch of an orange tree and cut off about 10 inches of new growth from the end of a branch. Then, with his ever-present citrus knife, he neatly shaved off a piece of new bark that contained a bud.

Walking to some 2-year-old seedlings growing in a nearby nursery, he squatted and cut a T shape in the bark of the seedling a few inches from the ground. Then he slid the bud into the opening in the seedling. This area would be wrapped with a waterproof material and kept growing for another 3 or 4 weeks, he explained, until the union of the bud and the rootstock was healed.

Nearly all of Florida's citrus trees are produced by the budding system.

Scientists and growers found that budded trees bear more fruit at an earlier age than trees grown simply from seed, and that they produce a crop of more uniform size and quality.

As many as 20 kinds of citrus can be grown on one tree, though only as a novelty.

It is important that the rootstock be resistant to a disease called "spreading decline" if planted near an area affected by the condition.

"Spreading decline" is the plant world's equivalent of the permanent blahs. Trees don't die from it but their production gradually drops and their leaf numbers decline. Nematodes—a kind of worm—cause all the damage. The nematodes attack young feeder roots so that eventually the tree loses as much as half of its food and water absorbing system.

The only cure for "spreading decline"—which can wipe out a grove's production—is to dig out the obviously stricken trees and all those trees nearby (even though they may not appear to be affected) and fumigate the soil to kill the nematodes. The next step is to replace the trees after 2 years with nematode-resistant young trees.

Any number of other diseases or accidents can kill or weaken an orange tree: a disease brought on by a fungus or a virus, a freeze, some unfavorable soil condition or even lightning.

In the subtropical climate that so favors the growth of orange trees, grove managers are constantly battling diseases that flourish in the moist warm air . . . diseases not only of the trees but of the fruit as well.

Orange groves are sprayed as often as three or four times a year to combat insects and fungus

The new Valencia orange tree that Trim plants will get special watering until it is established in its new setting. It will be resistant to spreading decline disease, which weakened its predecessor.

diseases. That's another reason Mathias likes to keep an eye on the weather. Temperature increases may trigger a sudden increase in the population of a particular insect. Wind or rain can foil a planned spraying operation.

Spraying is expensive. The Haines City cooperative has $456,000 tied up in spraying equipment (12 sprayers, tractors, and supply trucks). The costs of the operator and the chemicals are additional.

It has been estimated that the cost of spraying the sandy hill groves of central Florida is nearly half the cost of production in those groves.

Routinely, Mathias sprays the groves under his care twice a year—once immediately after the petals of the orange blossoms fall and again in the summer. With the first, he hopes to control melanose, a fungus which raises brownish lesions on the fruit, and stem-end rot of mature fruit.

The summer spraying is to control all those scales that aren't held at bay by natural predators—and there's a long list of them. Scales suck the life juices out of leaves and sometimes twigs and branches. In this way, they weaken the tree's ability to make and transmit food to other parts of the tree, including the fruit.

WASP HELPS GROWERS

The orange's worst insect enemy over the years, armored scale, has been defeated in recent years by bringing in one of the scale's natural enemies, a tiny wasp.

Mathias considers the rust mite the worst remaining pest in the orange groves. If he needs to spray between regular applications to control it, he will.

The groves may be attacked by aphids which like to feed on young new leaves developing in the spring. When the aphids strike, they strike in a hurry and Mathias has to respond quickly.

There are a host of other insects and diseases that might strike the orange groves anytime, and the managers must be ready for them. The groves in Mathias' cooperative are divided into three districts. Each district has a "bug man," who continually checks on the condition of pest populations in his district. When an undesirable insect population reaches a critical level, he starts spraying.

Regulations controlling the use of chemicals on oranges and other citrus are exceedingly strict and enforced. They govern not only the application of pesticides on the fruit before harvest but after harvest as well.

The regulations are enforced by the Food and Drug

Administration (FDA), State departments of agriculture, the U.S. Department of Agriculture (USDA) and the Environmental Protection Agency (EPA). Still further rules for the protection of those applying the chemicals are enforced by the Occupational Safety and Health Administration (OSHA).

"The FDA insists on several years of rigorous toxicity tests before any chemical can be used on fresh produce," explained W.F. Wardowski, associate professor and extension horticulturist at the University of Florida's Agricultural Research and Education Center at Lake Alfred, Florida. "Pesticide residues in foods are strictly controlled. The limits set are usually about 1/100 of the least amount that has ever been shown to have any detectable effect on any laboratory animal. Even then, the EPA allows only the minimal amount necessary to do the job."

Mathias is more concerned about the appearance of his fruit than most Florida growers simply because, under normal conditions, the fruit from his cooperative is going to be sold fresh in the supermarkets.

About 90 percent of the oranges grown in Florida are sold to processors, most of whom create orange juice in one form or another. The processors don't care what an orange skin looks like as long as it is healthy.

In the orange business, the Haines City cooperative is said to be selling to the fresh fruit market. If the cooperative's fruit should be damaged by freeze, however, it can be salvaged by processing. The fruit is still wholesome, but it won't be as juicy after a freeze.

SELLING ORANGES

After inspecting the resetting of trees, the grove manager drove toward the cooperative's packing plant at the edge of Haines City. In its offices, salesmen are busy on telephones selling oranges and other citrus fruit to chainstore buyers. The fruit will be picked to the order of "the chains," probably the next day.

"Our sales department and our harvesting department foremen will meet this afternoon and decide how much to harvest tomorrow, based on the orders they already have and how many they can reasonably expect to get tomorrow," Mathias explained.

"It works out very well for us. We don't have any fruit to store. And if we get to picking a little bit too much, we'll just get on these radios and stop the harvesters right where they are."

Monday and Tuesday are the busiest picking days. Oranges picked then will arrive in supermarkets hundreds of miles away in time for the heavy weekend demand.

It's possible to pick oranges on short notice because most varieties stay mature for several weeks on the trees. Some varieties begin to mature early in the season, some in the middle, and some late in the season.

Oranges are picked in Florida for the fresh market from September to July 1. Oranges picked for processing are harvested from December through March, and then from the end of April through June.

It's somewhat different in other States. California's navel oranges are harvested and marketed from November to May or early June. Its Valencia oranges are harvested from March 15 to December 15.

Texas oranges are marketed from September 25 to May 15. Arizona markets its oranges from November 1 to June 30.

Early ripening oranges such as Hamlin and Parson Brown do not stay in good condition on the trees as long as the later maturing oranges, and so are picked as soon as they ripen. However, midseason and late-maturing oranges will stay in good marketable condition for several weeks on trees.

Also, once an orange is picked it will never get more mature. There's no such thing as a ripe orange that wasn't ripened on a tree.

On the other hand, there are lots of green-colored oranges which are ripe.

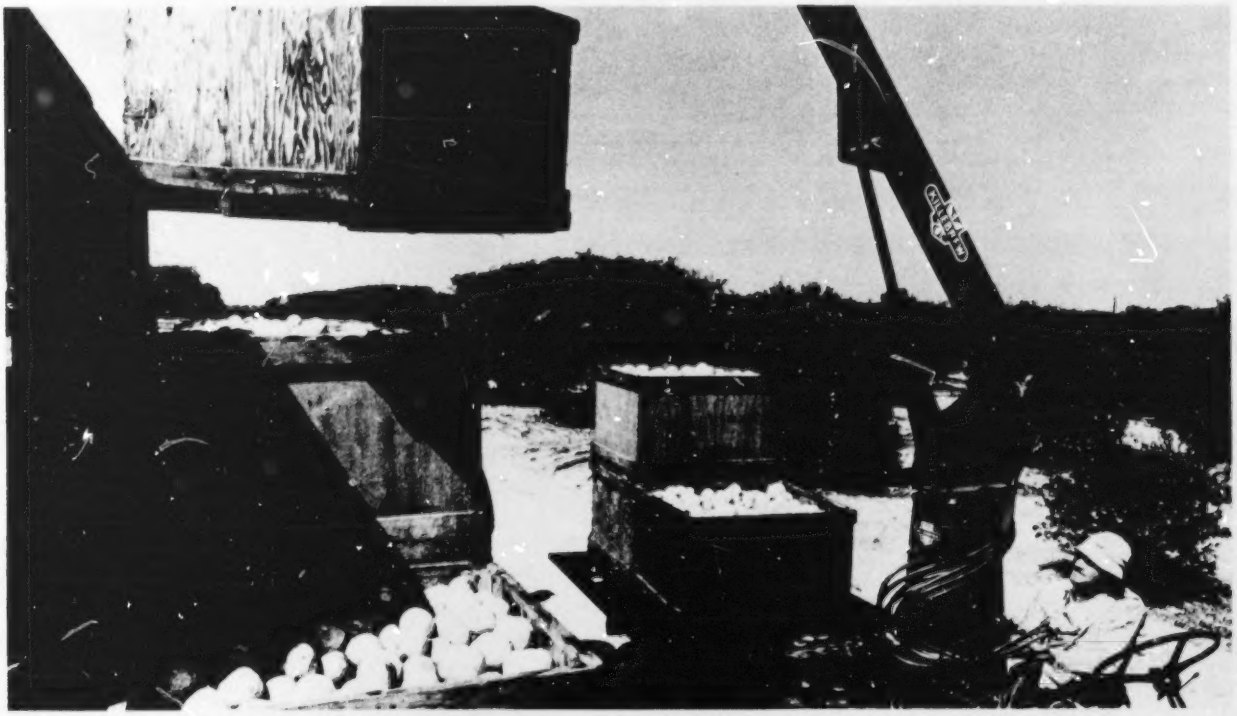
COLD COLORS ORANGES

Florida oranges often don't turn orange—even when they are ripe—in the fall of the year because it takes cold nights to color the fruit orange, and the nights haven't been that cold yet. Florida packing plants which sell oranges to the fresh market in the fall turn them orange by passing ethylene gas over them. That eliminates the green-colored chlorophyll in the skin, leaving a pale orange-yellow color to predominate. In fact, this is exactly how the oranges degreen normally on the tree, if the nights are cold enough.

In the fall, Florida oranges which have been degreened with ethylene gas may also have color added after the washing because the degreening leaves the fruit yellow or a pale orange. But each carton of oranges so treated must be stamped, and the Florida Department of Agriculture insists that these oranges have more juice in them than noncolored oranges. The Department also tests each coloring dye to be sure it is harmless both to the fruit and to the consumer.

If consumers could be convinced that green-looking ripe oranges can be just as tasty as orange-colored oranges, a lot of expensive work could be saved at the packing plants.

At the Haines City cooperative's plant, Mathias



Duane Hatcher of Haines City, Florida, loads pallets filled with oranges to be sold fresh. Pickers filled the pallets from sacks they carried into the trees. Each pallet contains 10 field boxes of oranges and weighs a little more than half a ton when full. Oranges headed for juice plants are dumped less carefully into open trailers.

found two forklift tractors buzzing around flatbed semitrailers like bees around a flower, picking off boxes of orange three at a time to carry them into the warehouse where processing would begin.

Inside the warehouse, the degreening operation was bypassed because it was spring and the oranges were the right color. The oranges were dumped immediately onto a conveyor belt, which carried them to a maze where oranges which were far too big or far too little were sorted out.

The remaining oranges were washed mechanically. Since this removes part of the orange's natural covering of wax, the wax has to be restored after the oranges have been air dryed so that the fruit won't shrink on the way to market.

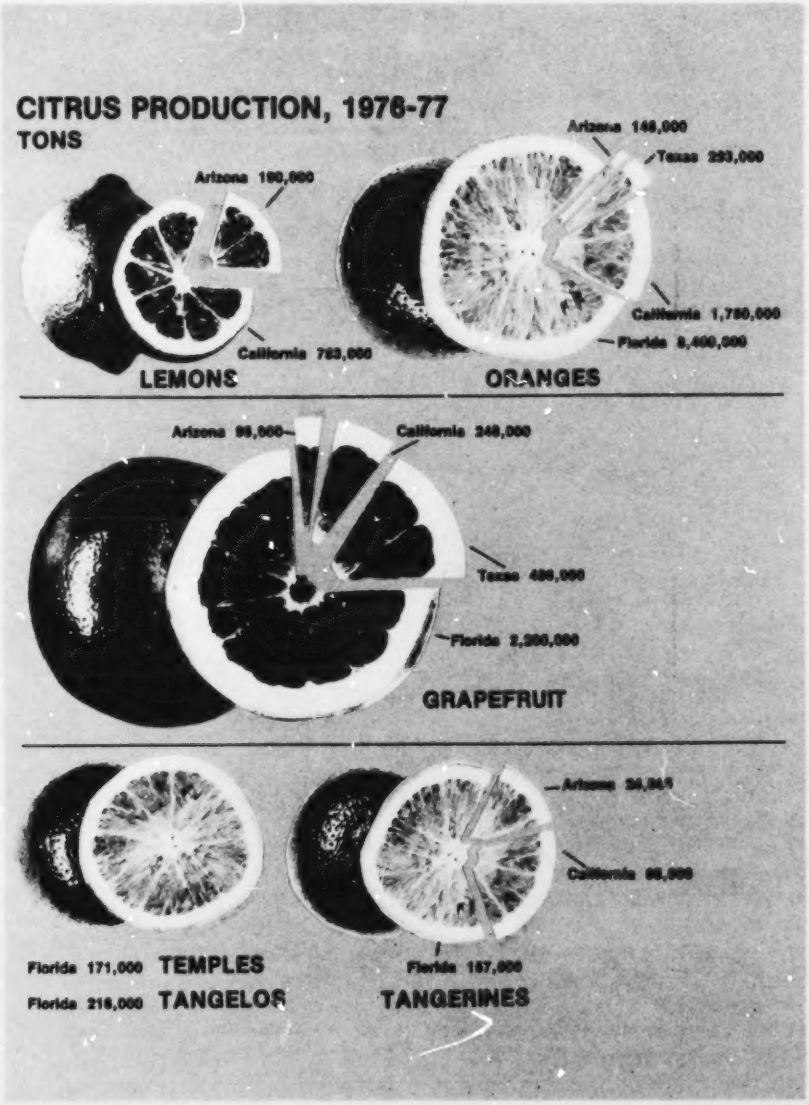
A fungicide also is sprayed on the oranges headed for the fresh market to make sure they arrive on the shelf free of ugly fungus diseases. One of the approved fungicides for this purpose is thiabendazole (TBZ), which is also used for medicinal purposes. Dr. Wardowski notes that a 50-pound child would have to eat more than 7 tons of TBZ-treated oranges in 2 days in order to get enough TBZ to equal a normal medicinal dosage.

INSPECTORS AT WORK

After the fungicidal spray, the oranges are again sorted according to size and checked to make sure they meet grade and size specifications set by a Federal marketing order. Inspectors cut open representative samples, testing them for ripeness and sweetness to meet Florida State standards for shipping. Then they are packed according to size (the smaller the orange, the higher the amount on the box or bag, because the number represents how many oranges are in the container).

A grower doesn't always get a check in the mail as soon as the last box of his oranges leaves the packing plant. His oranges are often pooled with other oranges of the same variety in the cooperative. The owner must wait until all the oranges of the same variety have been sold by the cooperative. All the Valencias grown in the cooperative are in the Valencia pool. All the Parson Browns are in the Parson Brown pool.

Assuming that the grower has a variety of citrus fruit in his grove, he will be receiving credit in his account from time to time as pools that contain his fruit are



closed out, that is, after all the fruit of particular varieties have been sold. These sales are credited against the costs of taking care of the owner's grove. At the end of the marketing year, he hopes to have more in sales credits than in charges against his account.

That's the return he receives on his investment.

From this point of view, Hull estimates Florida grove owners have received only a little more on their investment over the years than they would have received if they had just put their money in a bank.

However, he notes, the value of citrus-bearing land has increased over the years. If a grove site is well selected, he said, it might be expected to double its value in 20 years.

The pooling of fruit by variety is a common practice in the marketing of Florida fruit. If a grower hasn't made a commitment to sell his oranges through a cooperative or to someone else, he can telephone two or three companies that process oranges and ask to join one of their pools. Then he can choose the company which offers him the best deal.

The grower promises to provide a specified number of boxes of fruit to the pool, or perhaps the output of a specified number of acres with a specific record of production. After a freeze, a grower wants to contract with a company which guarantees to pick his oranges quickly, before they dry out.

PARTICIPATION PLAN

A first cousin of pooling is the participation plan. This is an agreement which a grower makes with a processing company before the season begins. The grower promises to market all of his fruit through that particular company, which usually provides for harvesting.

Sixty miles southwest of Haines City, another Air Force veteran of World War II, Tom Sasser is a grower with a participation agreement with Tropicana Products, Inc. Tropicana manufactures both chilled juice and frozen concentrate.

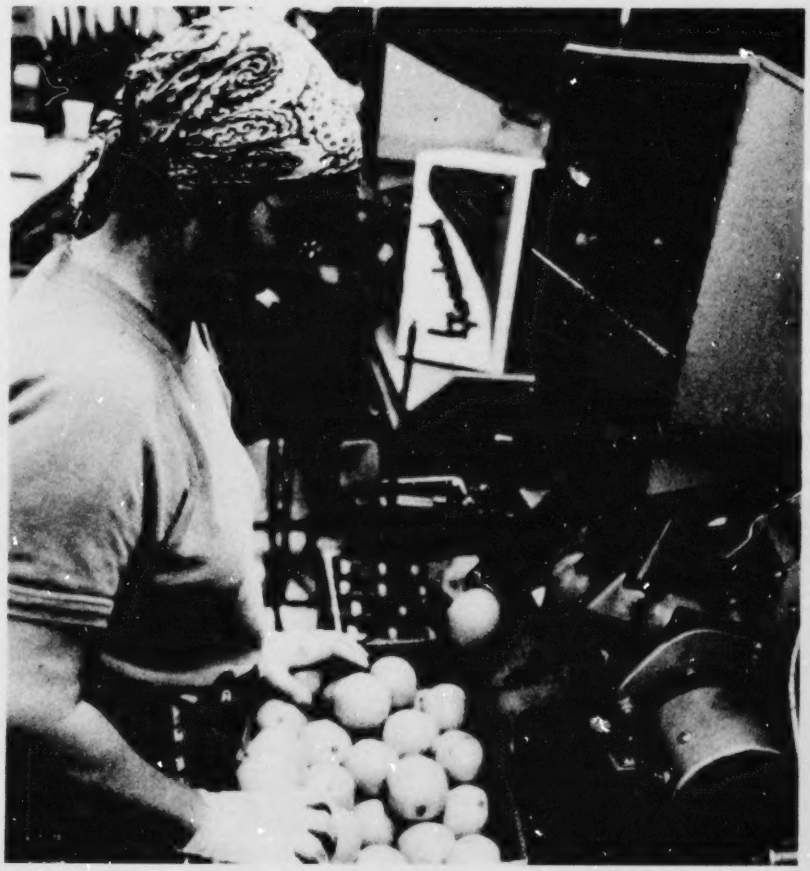
Sasser manages his own grove, 160 acres just outside of Wauchula, which he owns in partnership with his brother-in-law. He doesn't belong to a cooperative.

Sasser, who is a former contractor who worked in other people's groves for decades, built up his own grove from scratch. Now he hires one man, Lester Davis, 59, to do the physical work of keeping the grove alive and healthy—"to do all the work that I used to do, and I hope a whole lot more," as Sasser phrases it.

"All Tom ever wanted was an orange grove," his wife Avis said, relaxing in their modern ranch style home in Wauchula.

She remembers the experience

Local ladies in the Haines City Citrus Growers Association packing plant examine every orange and throw out those which don't make U.S. Grade No. 1. Every fourth acceptable orange will have the word "Florida" stamped on it. Losers go to the juice plant.



Right:
Women such as Joel Anderson, of Haines City, Florida, who pack oranges for shipping know exactly how many oranges of each size will fit in a box, and how they must be arranged for all to fit. California's packing operations are similar.

of building up the grove.

"Tom would come in from the grove with his hair so yellow from spraying sulfur (a treatment for a pesky insect, the rust mite) that he'd have to grow a whole new head of hair," she mused. "Tom did all the disking, all the fertilizing, and all the irrigating."

Then she added, "Now we hire it all done. These are the leisure years."

Tom, who is 68, and Avis, 56, live 13 miles from their grove, in the city where Avis was city clerk for many years. Married 21 years, they are both golfers and celebrate their birthdays on the same day.

When he inspects his grove, Sasser, too, plunges his heavy old car through the middles . . . just like Mathias . . . just like all citrus men. Today he headed toward the pumphouse that lies in the center of his grove to meet Davis and help rig up his grove's sprinkling system.

On the way to the pumphouse, Sasser paused alongside a small garden of peas he had planted to see if "the damned armadillos (one word, the way he pronounced it) had dug any holes." They hadn't. Armadillos digging holes in vegetable gardens out in the grove are a real nuisance in the Sassers' lives.

At the pumphouse, Sasser helped Davis start the diesel-driven water pump by jumping an electrical charge through cables from a tractor battery to the diesel engine.

Tom Sasser of Wauchula, Florida, worked decades taking care of others' groves until he and a brother-in-law bought their own grove. Tom lives in town 13 miles from their grove but checks on the fruit trees nearly every day.

WATER IS IMPORTANT

Distribution of water to the trees—irrigation—is so important that Sasser would cut back on the amount of land he bought to buy irrigation equipment if he were starting a new grove now.

Sasser owns two self-propelled mobile water guns that shoot water 140 feet horizontally (200 feet with the wind) and water five rows of trees on each side of the guns as they slowly move forward like huge automatic lawn sprinklers.

When Sasser decides to irrigate—after about 2 weeks without rain—Davis runs two strong metal cables out from the pumphouse. Six-inch pipes deliver water from the pumphouse to the guns. Each gun will pull itself by water power along those cables at the rate of one tree every 15 minutes until it reaches the end of the cable.

Sasser irrigates at night to reduce evaporation and avoid wind. By morning, 10 rows on each side of the pumphouse have been irrigated. Then Davis moves the rig out 10 more rows.

It takes nine nights to water all of Sasser's grove. Sasser said he'll add a third water gun when he can afford one.

Half of Florida's orange groves have an irrigation system. Some owners believe the benefits would not match the cost of installing the pipe and sprinklers.

Groves with deep soil need irrigation less than groves with shallow soils. Trees in shallow

Lester Davis, 59, left, and Tom Sasser, 68, work shoulder to shoulder to solve problems in the Sasser grove. But Lester does most of the hard physical work now. When he was developing the grove, though, Tom did all the disking, all the spraying, all the fertilizing—everything but the harvesting.

soils have shallow roots and can't survive dry spells; whereas trees with deep roots (in deep soils) can find more water to survive in dry spells. At the same time, groves in shallow soils need more drainage pipe to carry off excess water. So groves in shallow soils need a greater investment in both irrigation and drainage equipment.

Of current interest in orange groves is the drip or trickle system of delivering water to each tree. This system of water delivery through shallow lines is aimed at saving both water and energy.

Most of Florida's annual rainfall of 52 inches occurs between May and September. That seems to be enough for the orange trees during that time—sometimes too much. But from October through April, perhaps May, the trees need more ground moisture than they get from rain.

This is particularly true in early spring when new growth is just getting started on the trees and the new fruit is setting. In late spring and early summer, there should be enough moisture, too, for the fruit to grow rapidly.

The best rains for orange trees are those of 1 to 3 inches.

Sasser regrets not having installed irrigation equipment in his grove in the beginning.

"I must have lost 100 trees one dry year," he recalled, surveying his orchard. It takes so long to get trees into production, that can be quite a loss.

"Don't ever let your trees dry out," Sasser warned. "Grow them as fast as you can. It takes 5 years to get any fruit to speak of. I'm just now (15 years after planting) getting into real production, and I'm not yet at my full capacity by any means."

Irrigation in Florida often means tall guns throwing water out over the orange trees. They start together in the evening but pull apart along cables during the night. Irrigation water is delivered beneath the trees in some groves, including those in California's San Joaquin Valley.

STARTED IN DEPRESSION

Sasser got into the orange business during the Depression. He bought a tractor, and went out "tractoring," meaning he cut down weeds between the trees with a gang of pie-shaped disks pulled behind his tractor. He was paid $1 an acre.

By the time World War II came along, Sasser had three tractors and spraying machines for the application of pesticides.

"In those days there weren't any groves as big as mine is now," he recalled. "Yet mine is small by today's standards."

After the war, Sasser headed back into the caretaker business. He bought four tractors—though he had to wait a year for delivery of the first one—and went to work full time spraying, disking, and fertilizing the groves of others. All that time, he was dreaming of owning a grove of his own.

In 1951, he and his brother-in-law started their first grove by planting young trees on 20 acres of bare ground east of Wauchula.

"The orange business wasn't too good before the war," Sasser said, as he drove back into Wauchula. "It was pretty good after the war, though I never made any money out of it. Then, in the midfifties, concentrate came along.

"They thought they'd never get enough juice. But they finally did."

In those few words, Sasser summarized the recent history of growing oranges in Florida, focusing on that fantastic time after a group of scientists led by Dr. L. G. MacDowell discovered a way to dehydrate orange juice so that it can be reconstituted with full flavor.

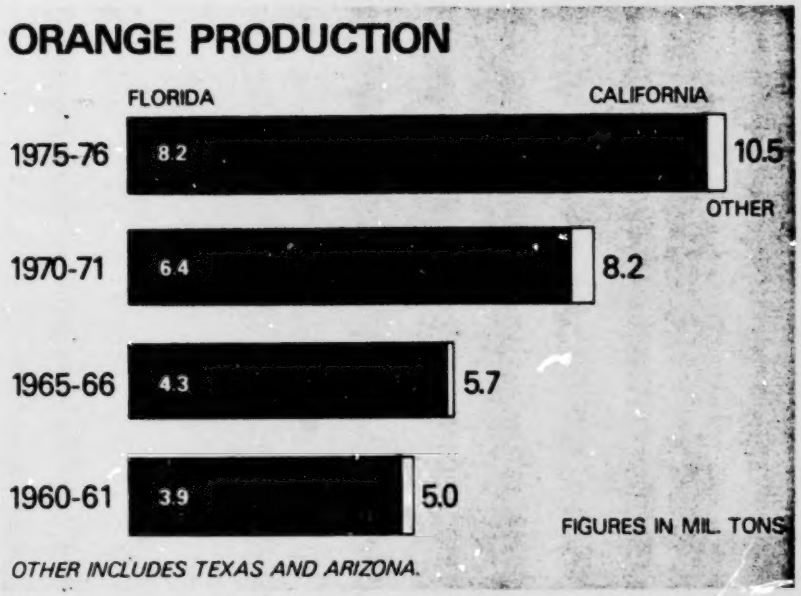
The scientists' idea was to super concentrate orange juice, then put back into this thick liquid a little fresh juice and some "essences" of the orange, which are vapors and oils given off in the processing. It is to this concentrate that you add water to get your morning juice.

Concentrates revolutionized the Florida orange business.

Since frozen concentrated orange juice was introduced commercially in the 1945/46 season, orange production in Florida has more than tripled (from 49 million boxes to 187 million boxes). The number of acres devoted to orange growing in Florida more than doubled in the same period.

"OVERPRODUCED"

The rapid growth of orange tree plantings in Florida finally led to relatively low prices to the



growers for the oranges, despite a sharp increase in the demand for frozen orange juice concentrate.

"In the past, a lot of acreage was planted with no thought of the market," Mathias commented. "We overproduced. A lot of people said we undersold, but sales have increased at more than 10 percent a year. The seller (such as a marketing cooperative) isn't the guy who grew too much of it."

Sasser sold his first grove early in 1962, the year of the last big freeze before 1977. He sold it before the freeze "to somebody who wanted it worse than we did."

Sasser and his brother-in-law had already bought 160 acres of pine, palmetto, and oak trees 13 miles east of Wauchula, and had started pushing the old trees over. By June 1962, Sasser had planted 110 acres of new orange trees. That December the freeze hit.

But Sasser was hardly touched by the frigid weather. He had banked every one of those young trees; that is, he had covered them with dirt up to a point just above where the orange tree bud had been attached to the root-stock. He lost very few trees.

It was important to Sasser that he plant the right kind of fruit trees. He had to guess accurately 12 years in advance which citrus fruit people would want to eat and drink.

He recalls that a neighbor planted "the wrong kind" of citrus and has since pushed over the trees with a bulldozer because "they didn't make him any money." The neighbor had planted a hybrid variety with an easily peeled skin designed for the fresh market, but they weren't popular enough. The neighbor planted a new variety aimed at the fresh market, but that failed to make money, too. So he bulldozed the second bunch of trees.

Sasser planted right—for the juice market.

He planted 90 acres of Valencias, a late-maturing variety, "because they're the best all-around orange for juice"; 40 acres of Pineapples, a midseason variety of orange, "because I didn't want all my eggs in one basket"; and 24 acres of Hamlins, an early variety, "because they provide more boxes per tree."

The remaining 6 acres are drainage ditches.

Sasser planted his trees 23 feet apart in one direction and 28 feet apart in the other. Such distances can be subject to much discussion among citrus growers. Years ago, orange trees were planted 30 feet apart in each direction. Now some are planted in spacings 12½ feet apart in one direction and 30 feet apart in another.

A grove with trees planted far apart won't provide as many oranges in the early years of its production, but later it will produce more than a densely planted grove. In a dense grove, each tree will produce less fruit because limbs will overlap and lower branches will be shaded. Use of the hedger, though, has permitted closer plantings.

"As the price of land goes up," Mathias explained, "trees are planted closer together. Early production is higher under those circumstances. But after you get some age on the trees, production goes the other way.

"We have a rule of thumb. If you are an old man, plant the trees closer together. If you are a young man, plant them farther apart."

Sasser's grove netted $7,166.70 in 1976. That was after $14,274.75 of the earnings was reinvested in drainage pipes in the grove.

The Sasser's income also includes Avis' retirement payments, a small Social Security retirement payment to Sasser, and a small salary that Avis draws from the grove's account because she acts as bookkeeper and "general run-arounder."

The land for Sasser's present grove cost $310 an acre.

"That was an outrageous price then," he recalled. "Now, with a grove on it, I'd want $4,000 an acre. But before I'd sell, I'd want to know what the tax collector would do to me.

"I'm doing all right or I'd get out. The thought of a cold spell coming doesn't jar me as much

BEST COPY AVAILABLE

Tom Sasser's wife, Avis, keeps the books. A retired city clerk, she also plays golf and has opened a career in selling real estate.

SASSER'S INCOME AND EXPENSES—1976

EXPENSES		INCOME	
Salaries	$10,585.83	Sale of fruit	$69,466.14
Trees replaced	2,207.25	Soil conservation	1,100.00
Supplies	1,481.86	Dividend	15.85
Machine hire	2,951.50	TOTAL	$70,581.99
Repair and maintenance	4,476.04		
Fertilizer and spray	10,418.11		
Gas and fuel	3,876.29		
Taxes	1,247.70		
Social Security taxes	1,436.78		
Miscellaneous	255.65		
Insurance	4,801.20		
Interest on notes	5,452.33		
Drainage	14,274.75		
TOTAL	$63,415.29		

Does not include Tom's labor and management.

Income	$70,581.99
-Expenses	63,415.29
Net	$ 7,166.70

as it used to. I'm beginning to think I can survive."

Growers of oranges for processing are paid according to how juicy and sweet their oranges are. The amount of juice (pounds per box) is multiplied by the percentage of sugar (called solids for simplicity's sake) to provide buyer and seller with a common selling unit called pound-solid. For example, a load of oranges that tests show will produce 50 pounds of juice per box of oranges and 10 percent sugar solids, provides 5 pounds-solid for payment purposes.

A grower says the price of oranges to be made into juice this week is 60 cents. That means the price is 60 cents per pound-solid. A box of oranges, then, is worth 60 cents times the pounds-solid, or $3 if the pounds-solid is 5 (0.60 × 5 = $3.00).

Growers like Sasser are paid for their oranges in two stages. Tropicana pays 80 percent of the current price for juice upon delivery of the oranges. The rest of the payment is made months later, when it is known what chilled juice sold for during the winter, spring, and summer. So the grower's payment is tied directly to the prices buyers are willing to pay for juice or its concentrate after it has been processed and usually stored.

Other firms have similar payment arrangements.

The danger for the grower (shared by the processor, of course) is that the price for juice will go down after the grower has received his first partial payment.

Sasser borrows enough money at the beginning of the crop year (September) to pay for the care of his grove during the year, and then pays back the loan from the four to six payments he gets for his oranges.

That's the participation method of selling oranges. There are also pooling arrangements available within the processed orange business.

There are cooperatives—the

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Florida Orange Marketers (FOM), for instance, which supply oranges only to Minute Maid within the Foods Division of Coca Cola, Inc. To join such a cooperative under a participation plan is, in effect, to join a pool.

THREE WAYS TO MARKET

There are three basic marketing options open to growers, explained Hull, who has used all three at one time or another. They may market through:

—The standard agricultural cooperative, such as the Haines City Citrus Growers. The members own the land, the trees, equipment, and the citrus fruit. They hire people to care for their property and to grow, harvest, and market their crop.

—Equity corporations with participation plans, such as Tropicana, Inc.; the Minute Maid Division of the Foods Division of the Coca Cola Company; and many other corporations. Growers sign a contract with the company, usually a firm which processes the oranges into fresh, chilled, or frozen concentrated juice. The contract calls for the sale of a specified number of a certain variety of oranges or of the output of a specified number of acres. Payment ultimately depends on the average sale price of the oranges by the season's end.

—Straight cash market. A grower who has some uncommitted oranges on his trees telephones any number of cooperatives or corporations to get the best price for his oranges one day. When there is some danger that the market is going down, a grower might choose this method rather than hope for higher prices later.

In the growing season of 1975/76, Hull sold three-fourths of his crop in the cash market and 25 percent in participation plans. In 1976/77, he reversed the percentages for each plan.

"Months from now, I'll be able to tell whether I made money this way," he said, while driving to his groves soon after the freeze of 1977.

The morning he said that, Hull had made a verbal contract over the telephone to sell a truckload of oranges to a concentrate plant near Lakeland.

"Verbal contracts are used throughout the citrus world," Hull said, as he parked his car inside a grove and waited for a spring rain to let up so he could inspect tree branches. "They are seldom breached. They involve sales ranging from $600 to $40,000 worth of fruit.

"If you don't honor your contract, the whole industry will know about it. Your reputation is worth something in this business.

"And there's not nearly the paperwork in selling 20,000 boxes of fruit as there is in buying a $400 used car."

Hull, who obviously enjoys beating the risks in orange growing, got into the business because he couldn't stand the thought of an indoor job. Like Mathias and Sasser, he is a veteran of World War II.

"I didn't want to punch a clock," Hull said, getting out of his car. "I didn't want to sit in an office. I didn't want to be a salesman with a route. But I wanted to work in some place as warm as Florida.

HULL FAMILY CORPORATION—1975

EXPENSES	
Fertilizer and application	$19,838.67
Agricultural chemicals	12,182.94
Spraying	8,599.33
Hoeing and herbicides	4,945.95
Bank, unbank (trees)	390.75
Hedging, topping	1,690.19
Irrigation	2,555.67
Cultivation	5,529.53
Contract labor	5,576.97
Rent	550.00
Supervisory salaries	6,600.00
FCM assessments	998.08
Picking and hauling	54,156.54
Depreciation	7,392.51
Interest	1,207.79
Licenses and taxes	12,787.04
Other	7,350.37
TOTAL	$152,352.33

INCOME	
Sale of oranges	$188,552.98
Sale of specialty fruit	25,617.18
Sale of grapefruit	2,768.72
Lease of block 10	6,000.00
Sale of M&K tank	2,716.31
Trailer rent	276.00
Office rent	1,070.00
Other	6,309.15
TOTAL	$233,310.34

Income	$233,310.34
-Expenses	152,352.33
Net	$ 80,958.01

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"My father had a few acres in citrus, so I asked my brothers and sisters if they would consider forming a family corporation and have me manage the grove. They agreed."

Starting with a 36-acre grove, the Hulls have added a net of 269 acres since 1949. In 1950 they bought some land at $50 an acre that cost only $3 an acre 10 years earlier. Now, of course, the developed land is worth at least $3,000 an acre.

Hull has always held other jobs in addition to functioning as the family's grove manager—first as a salesman, then as a representative for Florida Citrus Mutual. He drives 1,000 miles a week for FCM and transacting business as manager of the grove.

As an FCM representative, Hull, 57, makes many personal contacts and conducts meetings of grower groups. He might one night explain the basics of grove management to a group of new owners and, on another, report on the Government's role in helping owners pay for trimming trees heavily damaged by frost. He might deliver a $100 reward check to a man who had caught another man stealing fruit (paid after the thief had been convicted).

Hull and his wife, Mary, 41, like to travel when they can both get away from their jobs. With their children grown and living away from home, Mary has turned to selling real estate and is doing rather well at it. She bought her own new automobile to park beside Cecil's in their suburban carport. The cars match in every way except in color.

Like most agricultural people, Hull has been busy in his community serving on the local mental health board for 3 years and as president of the Lake County Farm Bureau for 1 year.

Retirement, to him, would mean quitting one of his jobs.

Meanwhile, he devotes 3 out of 4 weekends and other odd hours to the management of the family grove.

He contracts for all the work in the grove. The family corporation owns only $52,000 worth of equipment, though $800,000 worth of equipment owned by contractors rolls through the grove.

"Before I'd buy all that equipment," Hull said, satisfied with his inspection of the grove and turning his car back toward Lakeland, "I'd want 4,000 acres to justify it (meaning it would take citrus production from that many acres to pay for the equipment in a reasonable length of time)."

Hull leaves no doubt that he likes managing the grove.

"There is a satisfaction in growing something . . . it's rewarding," he said. "Then, of course, there are the capital gains."

He told of recently selling 26 acres of land he described as "marginal" for $26,000. The original cost of those acres to his family's corporation 20 years ago was estimated at slightly more than $500.

However, for annual income, Hull wouldn't recommend growing oranges.

In 1975, the Hull family's 305-acre grove netted close to $81,000, divided among the families of the six brothers and sisters. In addition to his family's share, Hull was paid $6,600 to manage the grove.

"If you're not a speculator of some kind, you shouldn't be in perishable fruit," Hull observed. Referring to the freeze of 1977, Hull said, "We went from an oversupply situation to an undersupply situation in 4 days."

Hull likes to stay flexible in his orange marketing arrangements.

He can either sell for cash or through a pool. Some growers will never be in Hull's position because they need cash to keep operating or to repay a loan, and can't wait for payment from the pool.

Noting that banks, insurance companies, and savings and loans associations lend operating funds to bonafide citrus growers, Hull borrowed operating expenses at 8½ percent interest in 1977 and put three-fourths of his oranges in pools. That way, if the price of orange juice went up more than 8½ percent by the time the juice from the pool's oranges had been sold, Hull would make more money than he would have made selling for cash.

On the other hand, if the price of orange juice went down after his opportunity to sell for cash, Hull would lose not only the cash from a declining market but the interest he paid for borrowing operating money as well.

Hull said there is a lot of difference in managers of citrus groves.

"If they once raised sheep out West," he said, "they now grow oranges like they grew sheep. If

WHAT'S A CHAPTER S?

Family farms are often owned by Chapter S corporations. Cecil Hull's family owns its orange grove through such a company. What is a Chapter S corporation?

It's a corporation organized under State laws. But for income tax purposes the corporation files its tax return under the option of subchapter S of the U.S. Internal Revenue Code. Basically, the income generated by the corporation is not subject to a corporation tax but is passed on to the stockholders, who pay income tax on it according to their total income.

There are other advantages and disadvantages, so each family or other groups of persons must weigh them to find the best way to own their income-producing property. Some may choose regular incorporation; others may choose partnerships.

Chapter S corporations are not dummy corporations—they have to be operating companies with 10 or fewer shareholders and only one class of stock.

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Mary Hull shows Cecil a book of property listings. She felt her previous job was limiting so she began selling real estate. Matching sports cars in their carport indicate she's been successful.

they once grew potatoes in Maine, they now grow oranges like they grew potatoes.

"You don't have to be very smart to beat the averages. That's one reason I stay in the business."

He, Mathias, and Sasser are optimistic about the future of orange growing.

"But we're going to have to manage it," Mathias warned. "You can't adjust the harvest from tree crops on a year-to-year basis. In the past, a lot of acreage was planted with no thought of the market. We overproduced."

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GROWING ORANGES

Seventeen-year-old Debbie Davis and her father, Ronald, listened to the voice from the weather radio receiver announce that "a weak front is dissipating over the central part of San Joaquin Valley this morning." Unfortunately, that meant there would be no rain to clear the fog in the afternoon, and Debbie would be driving home that night in the fog.

It also meant that, again, her dad couldn't harvest his navel oranges. Dense fog dampens the skin of oranges, makes them so sensitive to touch that they break out in little green spots when they're handled. And green spotted oranges don't sell well in the supermarket, so they aren't even shipped.

Despite the fog, Debbie drove the family car to Redwood High School in Visalia that day because she needed to stay late to rehearse in the school play.

Much of the winter in California's San Joaquin Valley is foggy. Fenced in on three sides by mountains in the center of the State, the valley is so foggy police routinely form fog patrols to lead long lines of motorists along practically invisible highways. From the Sequoia National Park on the east, 6,000 feet above sea level in the Sierra Nevada's, the valley often looks as if it had been filled with loose cotton.

Yet, despite the fog, more than $100 million worth of oranges are harvested each year in the fertile valley—right at the base of the Sierra Nevada.

Among the growers are Ronald and Joanne Davis and their daughters, Debbie and Wendy.

Breezes at the foot of the mountains warm their orange groves in the cold season, which usually runs from November 20 to January 20.

Atop the mountains, spring's melting snow becomes the water basic to the valley's agriculture.

Unlike half the orange groves in Florida, irrigation is an absolute necessity in San Joaquin Valley groves.

Water is brought in furrows to each tree on the Davises' 350 acres all through the hot dry summer. One source of that water is 10 wells, which pump an average of 200 gallons of water per minute to the 350 acres.

"From the first of June to the first of October, the pumps are running 90 percent of the time," Davis said. "Still that's not enough to supply the water we need."

The rest of the Davis water comes from melted snow off the mountains, stored either in Millerton Lake, 60 miles north of Visalia, or in the closer Kaweah Lake. A 152-mile-long concrete conduit called the Friant-Kern Canal brings the water from Millerton Lake. The Kaweah River delivers the rest.

Irrigation water is essential to all crops grown in the middle of the San Joaquin Valley. It rains barely an inch between the first of May and the end of September. The mean maximum daily temperature in July

Debbie Davis and her dad, Ronald, of Visalia, California, expect fog again because of news on the weather radio. That means Debbie will drive home from high school in the fog that afternoon and her dad won't be able to get his oranges picked. Oranges are subject to spotting if picked while damp from fog.

IN CALIFORNIA

is just under 100° F.

Agriculture fairly exploded in the San Joaquin Valley after irrigation canals were built there in the late forties and early fifties. The Davis farm itself, founded in 1913, more than doubled its original 140 acres in citrus.

Davis orders his canal and river water in February from the governing bodies of two irrigation districts. He pays about $3 per acre foot, which is the amount of water needed to cover an acre of land with a foot of water.

Water from the canal and river enters each irrigation district through headgates and is distributed through underground pipelines. The amount of water entering each grove is recorded on a meter. Within the grove the water flows through smaller underground pipes into ground-level gates that slosh water steadily out into the furrows.

Irrigation costs Davis about $2,700 a year, and he pays another $10,000 a year in irrigation district taxes. That's 10 percent of his cost of growing oranges ready to be harvested.

For the 200-acre grove surrounding his ranch-style homestead, Davis estimates his income and expenses for 1975/76 as shown below.

Like Florida growers who sell to the fresh market, Davis is concerned not only with healthy trees but spotless fruit. So much of his expense in growing oranges is that of timely spraying and careful picking. With three full-time employees, he does his own spraying and other maintenance work, plus his own hauling of the picked fruit. But he contracts to get the picking done.

Frost protection is important between November 20 and January 20. Like other growers, Davis has placed wind machines among his trees, about one every 10 acres. These propellors atop high towers pull warmer air down onto the trees on cold nights. Oil-burning grove heaters provide additional warm air, although they are becoming a thing of the past.

The wind machines can be heard for miles on cold nights in the citrus groves of Tulare County, sounding, people say, "like a bunch of B-17's coming in."

Unlike Florida, there is little danger of tree loss due to cold in the San Joaquin Valley. The trees surrounding the Davis home have survived since 1913. Yet for the fruit itself, the climate in the Valley is the most hostile citrus climate in the world, with the possible exception of Japan, where it snows.

California's famous Washington navel oranges mature and are harvested at the same time that cold weather strikes. The days are short and picking may not begin until 1 p.m., when the fruit has dried off.

Davis delivers his oranges to a farmers' cooperative, the Klink Citrus Association, of which he is a member and is the secretary of the board of directors.

Davis harvests his oranges when his cooperative tells him they are needed.

The cooperative is told its prorated share of the volume of oranges harvested each week by a committee which operates under a Federal marketing order. This committee, which is appointed by the Secretary of Agriculture, meets each week and recommends the number of carloads of oranges it believes markets in the United States and Canada can handle efficiently. If the Secretary concurs, he issues a regulation establishing that quantity. The order, requested by growers and shippers, was put into effect after a public hearing and after other procedures allowed for input by interested persons. Finally, more than three-fourths of the growers had to vote for the order.

In Florida a Federal marketing order which functions similarly regulates the grades and sizes of oranges that may be shipped. Again, regulations are recommended by a committee, and if deemed appropriate are put into effect by the Secretary of Agriculture. This order does not authorize regulation of the weekly flow of oranges to market, but it has provision for "shipping holidays," which may be set during the Thanksgiving and Christmas periods to prevent a glut of oranges in the markets.

Klink Citrus, where Davis delivers his oranges, is a member of Sunkist Growers, Inc., a federation of farmer cooperatives.

Besides holding membership on the board of his packing cooperative, Davis is so busy in community affairs that some weeks are known as "phantom father weeks" in his family.

There was a time when Mrs. Davis, whom the family nicknamed "Mrs. School Booster" because of her activities for the school, was gone all the time too; but now she's concentrating on the family. The family skis and plays miniature golf together, and the children have friends over for volleyball and swimming.

Unlike Florida growers, many California orange growers live at their groves.

"There are a lot of absentee owners in the valley," Davis said, "but

DAVIS GROVE (200 Acres Near Home)

EXPENSES*	
Cost of production	$84,900
Taxes	13,000
Picking and hauling	63,000
TOTAL	$160,900
Income	$174,600
-Expenses	160,900
Net	$ 13,700

INCOME	
Sale of fruit	$174,600

*Does not include depreciation or his labor, management and return on investment.

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most of my friends live 'under the tree.'"

The 200 acres around his home were incorporated as a family corporation in 1950 as Mardo Farms, named after Davis' mother Marjorie and her sister Doris. Davis also owns part of another 150 acres and manages still another 80 acres for a grower who lives in Los Angeles.

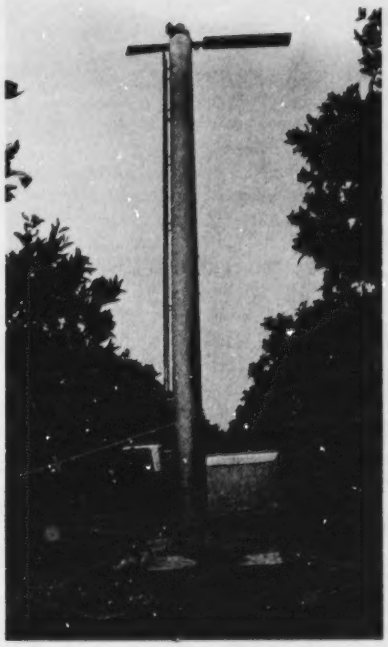
Davis thinks of himself as more than a manager. "I've got to get out and do things with my hands," he said. "I'm not a coat-and-tie man . . . except when someone is getting buried or getting married."

An avid sports fan, he once wanted to be a sports announcer; but even when he was away at Occidental College in Los Angeles, he called home frequently to inquire about the farm.

What would he tell people who live in the city?

"Tell them that oranges come off a farm, not out of a grocery store," he said.

Lunch can be as graceful as it is casual in the Davis ranch home, above. Left to right are Joanne, Ronald, Debbie and Wendy.



30-foot high wind machines pull higher warmer air down into the orange trees during cold winter nights in the San Joaquin Valley. The German shepherd which accompanies Ronald is Cey (pronounced kee), which is Welsh for "dog."

Joanne Davis holds a family favorite, a Pomeranian named Megan.

The precious water which spills out beneath Davis orange trees, was probably snow the previous winter. After the snow melted on nearby mountains in the spring, it would have been stored behind a dam 60 miles away, then released for delivery by a concrete-lined canal to underground pipes to the Davis ranch.

QUALITY CONTROL

State pride is one of the big reasons consumers can count on buying tasty good-looking oranges at the store. None of the States which produce oranges—Arizona, California, Florida and Texas—wants a reputation as the State which turns out sour or badly discolored oranges. That would be fatal to their industry.

As far back as 1911, though, enough growers were willing to ship immature oranges to distant cities that the Florida legislature passed laws which guarantee the maturity of oranges being shipped out of the State. Each of the orange-shipping States has similar laws.

When is an orange mature?

Five characteristics must be "just right." They are color, juice content, sweetness, acid content, and the relation of sweetness to acids.

Color can be a problem in Florida in a warm fall. Cool nights are needed to change the color of the fruit to orange even if it is mature. But the color of the oranges will at least start to break from a leaf green to a yellowish green as they mature. Florida law requires all oranges which are to be shipped as fresh fruit to have at least 50 percent yellow on the skin (except the Parson Brown variety, which must have at least 25 percent yellow). If the required color break has occurred naturally, degreening with ethylene gas and the addition of orange color is permitted.

Florida law says a standard box of 1-3/5 bushels of oranges must contain at least 4½ gallons of juice in order to be shipped—5 gallons per box if color has been added to the fruit. Such juiciness is an indication of maturity.

The amount of sugar in the juice of a sampling of oranges to be shipped is measured with a hydrometer, which is like the instrument which measures the amount of antifreeze in an automobile's radiator. The more sugar, the higher the hydometer will read in degrees Brix (named after a German scientist). Usually orange juice will register 12 percent soluble solids, three-fourths of which are natural sugar.

Florida law requires that oranges which are to be shipped between August 1 and October 31 must have at least 9 percent soluble solids and those shipped between November 1 and November 15 must have not less than 8.7 percent. After that, the soluble solids test isn't needed.

The amount of acid in orange juice decreases and the amount of sugar increases as the fruit matures. And the taste is affected. So, further regulations deal with the acid-sugar ratios in oranges to be shipped.

Besides State regulations on maturity, the Florida growers are concerned about the size of the oranges that are shipped out of the State and other aspects of their quality. In 1938, they asked for a Federal marketing order to control the size and quality of oranges being shipped interstate. Since then, under that order, shippers and growers meet several times during the harvesting season to decide where to draw the lines on quality and size of the oranges being shipped—over and above the maturity standards set by State law.

Then Federal-State inspectors enforce the agreed-upon standards within each packing plant.

In addition, after a general freeze in Florida, the Florida Citrus Commission meets within 96 hours to determine whether there has been serious damage to the fruit. If it determines that the fruit has been seriously damaged, then it can put an embargo on all fruit shipped for fresh consumption up to 10 days after the order becomes effective.

In California the marketing order permits the industry to regulate not only the size of the fruit being shipped but the amount of it that is shipped as well.

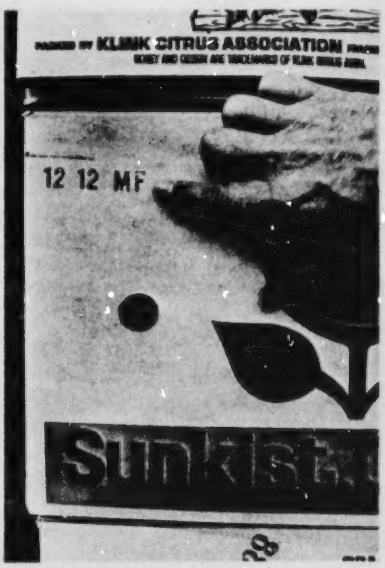
All of Florida's concentrated orange juice is processed under continuous Federal Government inspection, in cooperation with the Florida Department of Agriculture. The same goes for chilled and canned orange juice packaged in Florida.

Inspectors watch every step of the process, check on plant sanitation, and run periodic quality checks on the product. They grade the final product.

The quality of the concentrate may vary with the brand and the price, but all of it must meet minimum standards. U.S. grades in Florida call for the sugar content of reconstituted juice to register 11.8° Brix and the solids-to-acid ratio in the juice made from the concentrate to run between 12 to 1 and 19 to 1 after it is reconstituted by the consumer.

To rate grade A, the reconstituted juice of a Florida concentrate must be not only of the correct color (as measured electronically) and free of defects such as sugar crystals, but must also taste like grade A juice—which is something each inspector must learn to detect.

From State to State, the flavor of oranges varies because of the difference in oranges grown in each.



Box marking identifies that the oranges in that box were packed December 12, and that they came from Mardo Farms, in case of inquiry. The number 88, below, is the number of oranges in the box, indicating their size.

FOUR KINDS OF ORANGE JUICE

There's fresh orange juice that you squeeze yourself. Then, there are the processed kinds: concentrated, chilled, and canned.

Most of the oranges grown in the United States are processed into juice in one form or another before they reach the consumer. Six times as many oranges go into concentrate as go into chilled juice and 3 times as many oranges go into chilled juice as into canned orange juice.

Still, in recent years, chilled orange juice has increased more in popularity than its rivals.

What is chilled orange juice? Usually chilled juice is the right strength to drink when the consumer finds it in the dairy products shelf of the supermarket. Generally, the juice has been extracted from oranges, pasteurized, chilled to near freezing, then shipped in packages that range in size from 4 ounce cartons to tank cars. That which is shipped in tank cars is repackaged nearer the consumer.

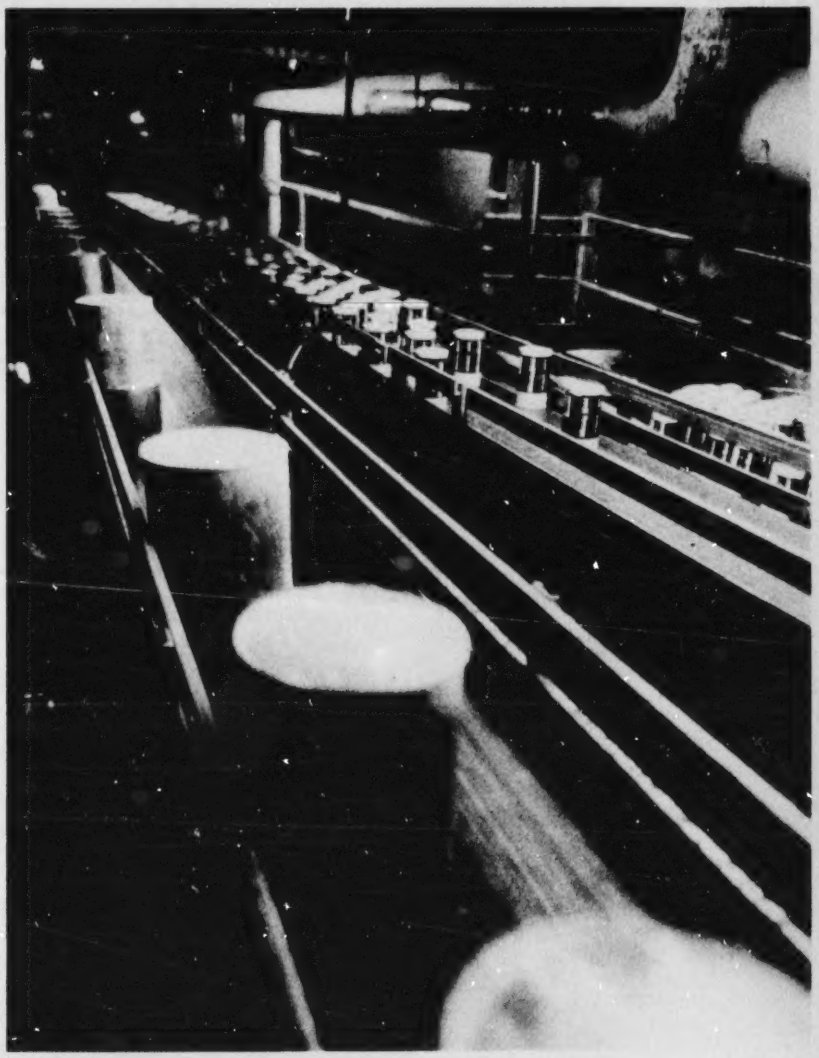
There are two variations of this single-strength orange juice. In the first, the juice may have been concentrated and then shipped, to be diluted to its drinking strength and packaged at its destination. Or, in the second variant, the chilled juice may have been frozen in blocks without being concentrated, stored for awhile, then melted and shipped as single-strength chilled juice. This once-frozen, single-strength juice may or may not be mixed with fresh unfrozen juice before shipment.

Most orange juice is concentrated at the packing plant, put in containers such as the 6- and 12-ounce cans found in supermarkets, then shipped to the consumer—who mixes water with it to obtain single-strength juice.

Some 30 to 40 plants in Florida are busy turning out frozen concentrated orange juice (or FCOJ, as the trade calls it). In their plants, juice is mechanically extracted from the oranges and then run rapidly through high-vacuum evaporators capable of removing 10,000 gallons of water an hour. The result is a dark orange-colored substance almost thick enough to chew.

This high-density juice is blast frozen down to -60° F and stored in barrels in subzero temperature warehouses or refrigerated tank farms. Later, when it is time to market this concentrate, it is brought out of storage and mixed with fresh orange juice, as well as the vapors and oils removed from oranges during the squeezing and evaporation process. The result—a slightly thinner concentrate with a much truer flavor—is canned, frozen, and shipped to the consumer, who will dilute it at the rate of 3 cans of water to one can of concentrate. It is found in the frozen foods section of the supermarket.

Canned orange juice, on the other hand, is squeezed from fresh oranges, heated briefly to about 200° F, then canned, sealed, cooled with a cold spray, and shipped. It can be kept unrefrigerated for extended periods.



The end product of most Florida oranges is frozen concentrated orange juice, packaged in various sized cans. Other forms of juice are increasing in importance.

ALL KINDS OF ORANGES

Valencia is the most popular variety of orange in the world. Juicy, sweet with a nice tartness, and containing only 5 or 6 seeds, the Valencia is a favorite of both the processor and the buyers of fresh fruit. The fruit is round or slightly oval and medium to large in size. Its rind is smooth, thin, and deep golden orange in color. Its land of origin is a mystery, but in Spain this late season orange was called "naranja tarde de Valencia." After awhile, that's what they called it in this country, "Valencia late," changed later to simply Valencia. In Florida, harvesting (and marketing) of the Valencia begins about February 1, gets most active in April, and ends early in July. In California, marketing of this variety is most active from April 20 to October 20.

The introduction of the *Washington navel* orange to California in 1873 has been described as one of the outstanding events in the economic and social development of that State. Considered seedless and bearing an easily removable skin, this orange looked as if it had a navel at one end—hence its name. Its skin is smooth, tough, leathery, and fairly thick. The white part of the skins of California oranges is thicker than that of Florida oranges because the climate is drier and the oranges adapted to conditions. A Washington, D.C. scientist imported 12 navel orange trees in tubs from Brazil in 1870 and gave a couple to Mrs. Luther C. Tibbetts, who headed for California and planted them beside her cottage in Riverside. The fruit proceeded to win prizes and fame. The most active marketing period for the Washington navel is from November 15 to May 20.

A seedier variety, but with lots of juice, is the mid-season *Pineapple* orange available December through February. Its the most important mid-season orange in Florida, and contributes its own special rich flavor and full, heavy aroma to the juice concentrate. Its origin is obscure, but in Florida it originated near Citra, where a minister had planted orange seeds he bought from a ship that had probably visited China.

A popular early orange in Florida (it matures from October into December) is the *Hamlin.* It is thinskinned, relatively seedless (up to five seeds), juicy, and has an excellent flavor. The tree bearing this orange yields more per acre than other orange trees under similar conditions; but individual fruits are often small. Hamlin was an early owner of the first grove of these trees in Florida.

Parson Brown is another early variety with lots of juice but more seeds. It is somewhat oblong in shape and almost yellow in color. It came from seedlings planted by the Rev. Nathan L. Brown near Webster, Fla. The seeds were said to have come from China.

The *Temple* is a popular fruit with an easily removable red-orange colored skin and readily parted sections, but it isn't an orange. It is said to be a hybrid of an orange and a tangerine, a tangor. Juicy and spicy flavored, it is flat at both ends and contains about 20 seeds. The Temple is harvested December through March in Florida. Its origin is Jamaica, but one of its early growers in Florida was William Chase Temple at Winter Park, who promoted its use.

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